UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/669,119	09/22/2003	James D. Kelly	18602-08098 (P2080R1C1)	8760

EXAMINER
RAY, GOPAL C

758   7590   11/10/2005

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MOUNTAIN VIEW, CA 94041

ART UNIT	PAPER NUMBER
2111	

DATE MAILED: 11/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Applicatin No.	Applicant(s)	
Office Action Summary	10/669,119	KELLY ET AL.	
	Examiner	Art Unit	
	Gopal C. Ray	2111	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _12/23/04 & 1/3/05_.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _18-26_ is/are pending in the application.

    4a) Of the above claim(s) _20-26_ is/are withdrawn from consideration.

5)☒ Claim(s) _18 and 19_ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

1.   The examiner acknowledges the addition of new claims 20-26 by the Amendment filed on 12/23/2004. Claims 18-26 are presented for examination. However, the examiner wants to point out that if applicant presents claims in the reissue to subject matter drawn to an invention patentably distinct from the invention claimed in the patent, 37 CFR 1.176 now permits the examiner to make a requirement for restriction. See also MPEP 1450.

2.   Newly submitted claims 20-26 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: newly submitted claims 20-26 are directed to "an apparatus and a method of avoiding deadlock in a computer system " whereas original claims in US Patent 5,996,036 are directed to "an apparatus and a method of arbitration".

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 20-26 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

3.   Applicant should cancel non-elected claims 20-26 in response to this office action. Claims 18-19 are allowable over the prior art of record. The following is an Examiner's Statement of Reasons for Allowance:

The instant application is a reissue of US Patent Application 08/779,632 which has become U. S. Patent 5,996,036. The primary reasons for allowance is that the examiner has done complete search and found no prior art of record, alone or in combination, teaches or fairly suggests, "an apparatus and a method for reordering transactions by slave devices without signaling a microprocessor of the computer system that the transactions are being ordered".

Any comments considered necessary by applicant must be submitted in response to this office action to avoid processing delays. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

4.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is urged to consider the reference.

5.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gopal C. Ray whose telephone number is (571) 272-3631. The examiner can normally be reached on Monday - Friday from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart, can be reached on (571) 272-3632. The new fax phone number for this Group is (574) 272-3632. (571) 273-8300.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [mark.rinehart@uspto.gov].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC central telephone number is (571) 272-2100. Moreover, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lastly, paper copies of cited U.S. Patents and Patent Application Publications ceased to be mailed to applicants with office actions as of June 2004. Paper copies of Foreign Patents and Non-Patent Literature will continue to be included with office

actions. These cited U.S. Patents and Patent Application Publications are available for

download via Office's PAIR. As an alternate source, all U.S. Patents and Patent

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the office of Public Records and from commercial sources. Applicants are referred to

the Electronic Business Center (EBC) at http://www.uspto.gov/ebc/index.html or 1-866-

217-9197 for information on this policy. Requests to restart a period for response due

to a missing U.S. Patent or Patent Application Publications will not be granted.

Gopal C. Ray

GOPAL C. RAY
PRIMARY EXAMINER
GROUP 2300

		Application/Control No.	Applicant(s)/Patent Under Reexamination
Notice of References Cited		10/669,119	KELLY ET AL.
		Examiner	Art Unit	Page 1 of 1
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U.S. PATENT DOCUMENTS

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	U	"Annihilation-reordering look-ahead pipelined CORDIC-based RLS adaptive filters and their application to adaptive beamforming" by Jun Ma; Parhi, K.K.; Deprettere, E.F. (abstract only) Publication Date: Aug. 2000
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Annihilation-reordering look-ahead pipelined CORDIC-based RLS adaptive filters and their application to adaptive beamforming

Jun Ma   Parhi, K.K.   Deprettere, E.F.

Dept. of Electr. & Comput. Eng., Minnesota Univ., Minneapolis, MN, USA;

This paper appears in: **Signal Processing, IEEE Transactions on** [see also **Acoustics, Speech, and Signal Processing, IEEE Transactions on**]

Abstract:
The novel annihilation-**reordering** look-ahead technique is proposed as an attractive technique for pipelining of Givens rotation (or CORDIC)-based adaptive filters. Unlike the existing relaxed look-ahead, the annihilation-**reordering** look-ahead does not depend on the statistical properties of the input samples. It is an exact look-ahead based on the annihilation-**reordering** look-ahead. The conventional look-

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ahead is based on multiply-add arithmetic. The annihilation-**reordering** look-ahead technique transforms an orthogonal sequential adaptive filtering algorithm into an equivalent orthogonal concurrent one by creating additional concurrency in the algorithm. Parallelism in the transformed algorithm is explored and different implementation styles including pipelining, block processing, and incremental block processing are presented. Their complexities are also studied and compared. The annihilation-**reordering** look-ahead is employed to develop fine-grain pipelined QR decomposition-based RLS adaptive filters. Both QRD-RLS and inverse QRD-RLS algorithms are considered. The proposed pipelined architectures can be operated at **arbitrarily high** sample rate without degrading the filter convergence behavior. Stability under finite-precision arithmetic are studied and proved for the proposed architectures. The pipelined CORDIC-based RLS adaptive filters are then employed to develop high-speed linear constraint minimum variance (LCMV) adaptive beamforming algorithms. Both QR decomposition-based minimum variance distortionless response (MVDR) realization and generalized sidelobe canceller (GSC) realization are presented. The complexity of the pipelined architectures are analyzed and compared. The proposed architectures can be operated at **arbitrarily** high sample rate and consist of only Givens rotations, which can be scheduled onto CORDIC arithmetic-based **processors**.

Index Terms:

adaptive filters   adaptive signal processing   array signal processing   computational complexity   convergence of numerical methods   digital filters   least squares approximations   parallel algorithms   pipeline arithmetic   recursive estimation   CORDIC arithmetic   CORDIC-based RLS adaptive filters   Givens rotation   LCMV adaptive beamforming algorithms   QRD-RLS algorithm   annihilation-reordering look-ahead pipelined filter   block processing   complexities   exact look-ahead   filter convergence   fine-grain pipelined QR decomposition   finite-precision arithmetic   generalized sidelobe canceller   high sample rate   incremental block processing   inverse QRD-RLS algorithm   linear constraint minimum variance   minimum variance distortionless response   multiply-add arithmetic   numerically stable look-ahead   orthogonal concurrent filtering algorithm   orthogonal sequential adaptive filtering algorithm   pipelined architectures

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